

# Policy Statement

**Subject** Guidance for Power or Thrust  
Response Testing for Turbine Engines,  
§ 33.73

**Date:** 03/18/2014

**Policy No:**  
PS-ANE-33.73-01

**Initiated By:**  
ANE-111

## 1. Purpose.

This policy statement provides guidance to aircraft and engine manufacturers and engine and aircraft certification offices when evaluating compliance with the power or thrust response standards of part 33 of Title 14 of the Code of Federal Regulations. It clarifies FAA policy regarding methods of compliance to the standards for turbine engine acceleration as specified in § 33.73, Power or thrust response. This policy also ensures that engine manufacturers' proposals for compliance demonstration to § 33.73 include a complete assessment of the engine's control system schedule impact on acceleration characteristics. This policy is applicable to all turbine engines, including turboshaft engines.

## 2. Background.

**a. Regulatory Requirements:** Compliance to § 33.73 is typically demonstrated during certification testing to § 33.89(a)(2) and (3), Operation test. The power or thrust response requirements of § 33.73 are a key benchmark to ensure that the engine demonstrates capability consistent with the aircraft power response requirements. These aircraft requirements include § 23.77, Balked landing, for small airplanes and § 25.119, Landing climb: All-engines-operating, for transport category engines.

**b. Tailored Control System Schedules:** Type approval holders sometimes tailor engine control system schedules in certain combinations of ambient conditions and engine power or thrust level to help comply with a variety of part 33 regulations. For example, a type approval holder may tailor an intercompressor air bleed schedule during certain ambient icing conditions in order to successfully demonstrate icing compliance testing to the requirements of § 33.68. This tailored bleed schedule may exist only over a specific inlet temperature range. However, control system tailoring, which can include bleed air system scheduling, fueling scheduling, and compressor variable vane scheduling, can also make it more difficult for type approval holders to meet this § 33.73(b) acceleration requirement while operating with the tailored schedules.

**c. Impact of Tailored Schedules:** These tailored control system schedules can result in critical conditions where power or thrust response is negatively affected which impacts compliance to § 33.73(b). For example, if a compressor bleed schedule is tailored so that the bleed valve is transiently opened during a narrow window of inlet temperatures, which can adversely affect the engines transient power response, then this range of inlet temperatures may become the most critical operating conditions in terms of engine power response.

### **3. Guidance.**

**a. Identify Tailored Control Schedules:** The type approval holder should assess the engine control system schedules to identify if any schedules could impact the engine's power or thrust response of § 33.73.

**b. Identify Critical Operating Conditions:** The most critical conditions for accelerations should be identified in terms of ambient temperature or other critical factors on control system schedules, when considering the go-around scenario or other installed aircraft engine power response requirements that this regulation addresses.

**c. Assess Control Schedule Effects:** For § 33.73 compliance demonstrations, type approval holders must demonstrate acceptable acceleration characteristics. This demonstration must include an assessment of tailored control schedules and their impact on power or thrust response to ensure compliance to the 5-second acceleration requirement.

**d. Use of Analysis is Acceptable:** Although the power or thrust response requirements of § 33.73 must be demonstrated through engine test, the effects of tailored control system schedules may be assessed and demonstrated by either test or analysis (for example, transient analysis).

**e. Compliance Requirements:** Type approval holders must demonstrate full compliance to the requirements of § 33.73 for the critical condition. Less than full compliance would require that the type approval holder seek an exemption from the FAA.

### **4. Effect of Policy.**

The general policy stated in this document does not constitute a new regulation or create what the courts refer to as a "binding norm." The office that implements policy should follow this policy when applicable to the specific project. Whenever a type approval holder's proposed method of compliance is outside this established policy, it must be coordinated with the policy

issuing office. Similarly, if the implementing office becomes aware of reasons that a type approval holder's proposal that meets this policy should not be approved, the office must coordinate its response with the policy issuing office.

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